No 62

An Inaugural Essay on Sensation and Motion

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passed March 29th 1816

Sensation & Motion

When I reflect on the obscurity of the subject on which I am about to enter, the criticising world to whose inspection it is to be subjected, and my incapability to do justice to a subject like this, I am on the verge of recoiling from the task, and abandon the pursuit, which alone can place me on an equality with the medical world. But in conformity with the laws of this institution, which make it necessary that I should become an author, I attempt it not without knowing the errors of judgment, to which I with every other person am liable.

This subject, like most metaphysical subjects has caused great controversy among medical men; yet they have left us

like a blind man searching for a feather on a windy day. Clouds of ignorance still intercept our view, and we are lured from the pleasing paths of truths by the art of reasoning into the subtle mazes of ingenuity.

The words Sensation is made use of to express a sense of pleasure, pain or some effect produced upon the body. With this acceptation I will proceed to enquire into its seat. Doctor Blumenbach in his treatise on this subject does little for it when compared to the rest of his works. In his physiology (Vol. 1st) page 215. He says "the nerves "are peculiarly subservient to sensation, what- "ever sensible impressions made on the body, "they like active heralds convey and announce to the sensorium and there give "rise to perception." This certainly cannot

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be true; for if the nerves were peculiarly subservient to sensation, the application of the agent producing it, must be to the nerve. It is physically impossible to produce sensation without the application of the agent to its seat. This being true one question immediately presents itself viz. whether the system is entirely made up of nerves or not? Is there an anatomist in the world that would say yes? I presume not one. Then I assert the position taken by the illustrious author is false.

There is not one part of the system which possesses vitality, that does not also possess sensation. The sharpest pointed instrument cannot be applied to the smallest portion of muscular fibre without producing sensation. If the nerves were its sole organs, the instrument certainly must be applied to the nerve in order to

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produce sensation. I believe that sensation is not confined to any particular part of the body; for there is not one part without it. Tendons and ligaments while in the sound state are possessed of little or no sensation but in the diseased are very painful and susceptible of impressions. I would ask, in this case whether we are to attribute the pain and susceptibility to impressions in the diseased state to the nerves? If so, I must then ask, why they possess so little sensation in a healthy state? Instances are recorded where the tendo achillis has been fractured without producing pain. Notwithstanding the ordinary insensibility of these parts, it was asserted by M. Bichat, that several animals who seemed to suffer no pain from cutting, puncturing or corroding the ligaments of their joints, appeared to be in great agony when

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these parts were violently stretched or twisted and he declares this to be the case, when all the nerves which passed over the liga-ments, and could not have been affected by the process, were cut away. He explained by this the pain which sometimes occurs instantaneously in sprains, in the reduction of luxations, and in other analagous processes. From this I would infer that the muscles and liga-ments are organs of sensation, that is, they are capable of receiving impressions and are possessed of the power of transmitting them to the nerves. When impressions made on the muscles or tendons, the nerves perform the office of heralds, they convey and announce to the brain, where the sense or will is im-mediately brought into operation, and from thence through the same medium to the parts acted on.

In paralysis it is not either the brain

or muscles that are affected, it is the nerve
only ~~by~~ The muscles here loose their functions
in consequence of an affection of the nerve;
for so soon as the nerve is capable of trans-
-mitting the will from the brain to the
muscle, motion and sensation is restored.
It may be said we do not know that it is
the nerve that is affected in palsy, I ad-
-mit we do not know it as a fact, but
if we reason from analogy we shall
not hesitate a moment in pronouncing
it an affection of the nerve. An anatomist knows
that if a ligature be tied around a nerve
going to a muscle, the motion of that mus-
-cle will be obstructed, and on loosening
the ligature motion will be restored.
While the ligature is applied we are by
no means deprived of volition, but may
will as strongly to move the muscle at that
time, as before the application of the ligature

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The nerve being incapable of transmitting
the will, we are inconsequence of that
inability deprived of its power. In this
case the faculty of the brain is not impaired
nor are the muscles deprived of their vitality
On this cause depends the palsy; for we can
will as strong at this time as at any other
yet without being able to effect a single
motion, inconsequence of the nerve being
deprived of its functions. It may here
be said that there is no sensation in a
paralytic limb, but in this there would
be very little reason, for wherever there
is irritation there must also be sensation.
It is impossible to produce the former
without the latter. I would wish not to be
understood that they are synonymous terms
or that they are necessarily produced by each
other. For I believe sensations of pain are

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often produced by the want of irritation; as in all cases of chronic pains.

Dr. Darwin in his treatise on the motions of the retina (page 16) says "that one side of the face has lost its sensation but retained its power of motion." Here the affection must have been in the muscle; for if the nerve had been affected the will could not have been conveyed from the brain to the muscle, which is indispensably necessary for its action.

If we commit an injury on any part of the body, and take no notice where the pain is, we shall perceive it altogether local and that too in the spot where the injury was inflicted. But a strong sensation of it exists in the brain. If the sensation was communicated to the brain, we should have the pain travelling from the injured part through the whole course of the nerve to the brain;

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but instead of that, we have it confined to the spot where the injury was inflicted.

I now proceed to the second part of this subject viz. Voluntary motion, I say voluntary because I shall attempt to prove all the healthy motions of the body are so, and shall allude to those entirely.

There are very few muscles in the body which physiologists have taken ~~from~~ under the power of the will, and those few are by far the most essential to life. The action of the heart, the diaphragm, the Intestines and those of the pupil of the eye, are deprived of that great agent in motion, I mean the will. In this I shall attempt to restore them to their proper rights and place; and give them a greater claim on the will than any other agent in motion.

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It is said by physiological writers, that the action of the heart and arteries is kept up by the stimulus of the blood combined with the power of habit, and that the will has no power over it. If the blood acted as a stimulus to the heart and arteries, their action would be in a just ratio, with the quantity they contain. If we give a dose of wine or opium, the action of the heart and arteries will be increased, and in proportion as the stimulus is diminished the frequency and action will also be diminished. The effect of stimulus on the system after being used for some time, gradually looses that effect which it first had. I must here beg leave to join with the late Dr Rush in calling stimulus an unit, and if the blood was the stimulus, certainly in proportion as the quantity was diminished, the frequency of the pulse would be diminished, But this is

not the case, for as the animal is bleeding to death, the frequency of the pulse is increased. Here then must be some other agent than the stimulus of the blood or power of habit. What is it? I answer, we have a greater will to protract life than any other thing in nature. As the action of the heart is indispensable in the circulation, the will in order to keep it up, acts with greater force on the heart causing it to contract and throw out the small portion of blood contained to support life. Perfectly analagous to the operations of the will on the heart, is that of every other agent in motion. For by their long continued application, we gradually become less conscious of their operation, although they continue to keep up their action as vigorously as ever. The motions of the diaphragm are kept up in the same way. Doctor Darwin places this under his head of associate

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motion, but this is another error loci. For it is as much under the power of the will as any other muscle. We can suspend its action at pleasure. But it may be said its action was suspended inconsequence of the suspension of respiration; or that it was inconsequence of a suspension of the action of the lungs. If so, I must ask why does not respiration go on when there is a ligature around the phrenic nerve? The reason evidently is, because the will is cut off from the diaphragm by the ligature. If it was from the association the action was kept up, the ligature would not affect it; because the action of the lungs would be sufficient for that purpose.

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